

REMARKS

Applicants have carefully considered the October 21, 2005 Office Action, and the amendments above together with the comments that follow are presented in a bona fide effort to address all issues raised in that Action and thereby place this case in condition for allowance. Claims 1-9 are pending in this application. Claims 5-8 have been withdrawn from consideration pursuant to the provisions of 37 C.F.R. § 1.142(b). By way of this Amendment, claims 1 and 9 have been amended. Care has been exercised to avoid the introduction of new matter. Adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, the depicted embodiments and related discussion thereof in the written description of the specification, including page 9, lines 4-13. Applicants submit that the present Amendment does not generate any new matter issue. Entry of the present Amendment is respectfully solicited. It is believed that this response places this case in condition for allowance. Hence, prompt favorable reconsideration of this case is solicited.

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakahata et al. (U.S. Pat. No. 6,284,690, hereinafter "Nakahata") in view of Kato et al. (U.S. Pat. No. 5,603,877, hereinafter "Kato"). Applicants respectfully request reconsideration and withdrawal of the rejection in view of the foregoing amendments to claims 1 and 9, as well as the following remarks.

The Examiner at page 2, of the Office action admitted that Nakahata fails to disclose a nitrogen pressure of 0.1-1 atmosphere. The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a nitrogen pressure of at least 0.1 or 5-20 atmG as suggested by Kato, because Kato discloses a sintering pressure in a sintering process for making silicon nitride to obtain a more dense ceramic structure and because

Nakahata discloses heating in a nitrogen atmosphere, which according to the Examiner, at least suggests an ambient pressure of one atmosphere. Applicants respectfully traverse.

Applicants have amended claims 1 and 9 to recite that the pressure condition in the sintering step is 0.1-0.5 atmosphere. Nakahata does not clearly distinguish the nitriding step (step (e)) from the sintering step (step (f)), and is silent about the pressure condition in the sintering step. Kato describes that the pressure condition in the sintering step is “e.g., at least 0.01 MPa (0.1 atm G), preferably 0.5 to 2 MPa (5 to 20 atm G)” (Kato et al., column 4, lines 56-57). As such, Kato does not teach or remotely suggest the pressure condition in the sintering step as defined in the present claimed subject matter. Thus, even if the applied references are combined as suggested by the Examiner, and Applicants do not agree that a requisite fact-based motivation has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

Furthermore, Kato describes the advantage of selecting the above pressure condition as follows: “However, if sintering under a controlled atmosphere of pressurized gas or sintering by hot isostatic press (HIP) is used, a denser ceramic structure may be obtained as a result of further suppression of the decomposition of silicon nitride” (Kato, column 4, lines 48-52). In contrast, the present invention describes the advantage of selecting the relevant pressure condition in the sintering step as follows: “In the producing method of the porous  $\text{Si}_3\text{N}_4$  according to the present invention, the low nitrogen pressure of 0.1-1 atmosphere (0.01-0.1 MPa) is employed for sintering to make  $\text{Si}_3\text{N}_4$  aggressively decompose and re-precipitate, to thereby obtain thinner columnar crystals as well as higher porosity and higher aspect ratio. At the time of sintering, the sintering agent takes a liquid phase, and  $\beta$ -type  $\text{Si}_3\text{N}_4$  grows from the  $\text{Si}_3\text{N}_4$  dissolved in the liquid phase to form columnar crystals. Since the columnar crystals stop growing when they run

against obstacles, a sintered body having a higher aspect ratio can be obtained with the nitride body of higher porosity” (page 8, line 27 to page 9, line 3 of the specification). It is considered that such a difference arises from the fact that Kato does not use the Si powder but the silicon nitride particles as the starting material and that the invention of Kato was made for an object that is completely different from that of the present invention.

In the present invention, the sintering step, carried out under the above-described pressure condition, has the special effects that decomposition and re-precipitation of  $\text{Si}_3\text{N}_4$  are promoted, whereby a sintered body having higher porosity is obtained (page 9, lines 8-13 of the specification). Kato conducts its sintering step preferably at a pressure condition higher than that of the present invention. Thus, it can be said that the above-described effects of the present invention are beyond the range that a person skilled in the art can readily recognized or expect from Nakahata and Kato. Applicants submit that the Examiner has not established a prima facie basis to deny patentability to the claimed invention under 35 U.S.C. § 103 for lack of the requisite factual basis and lack of the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999).

In claim 9, the pressure of the nitrogen atmosphere in the nitriding step is defined as well. Neither Nakahata nor Kato discloses the pressure condition in the nitriding step. When the pressure condition is out of the relevant range, various disadvantages are expected (as described on page 8, lines 12-17 of the specification: “If the nitriding step is conducted in the nitrogen atmosphere of less than 3 atmospheres, the reaction rate will be low, and non-nitrided Si will remain. If it is conducted in the nitrogen atmosphere of more than 10 atmospheres, while the reaction becomes fast, the cost required for the device will be too high, and operability will

also be degraded”). That these disadvantages can be overcome is again beyond the range a person skilled in the art would have expected from the applied art.

As described above, there is no motivation to combine Nakahata with Kato, making the combination itself difficult, and thus, a person skilled in the art would not readily conceive the present invention. Applicants submit that the Examiner has not established a *prima facie* basis to deny patentability to the claimed invention under 35 U.S.C. § 103 for lack of the requisite factual basis and lack of the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999). Applicants submit that the Examiner’s announced motivation is not based on the requisite factual basis, but rather is improperly predicated upon speculation. *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1078 (Fed. Cir. 1994); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.3d 1264, 20 USPQ2d 1746 (Fed. Cir. 1991); *In re Oelrich*, 666 F.2d 578, 212 USPQ 329 (CCPA 1981).

Accordingly, reconsideration and withdrawal of the rejection of claims 1-4 are respectfully solicited.

It is believed that all pending claims are now in condition for allowance. Applicants therefore respectfully request an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner’s amendment, the Examiner is invited to call Applicants’ representative at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

• 10/750,870

including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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